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Geometric analysis aspects of infinite semiplanar graphs with nonnegative curvature

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In the present paper, we apply Alexandrov geometry methods to study geometric analysis aspects of infinite semiplanar graphs with nonnegative combinatorial curvature in the sense of Higuchi. We obtain the metric classification of these graphs and construct the graphs embedded in the projective plane minus one point. Moreover, we show the volume doubling property and the Poincar\'e inequality on such graphs. The quadratic volume growth of these graphs implies the parabolicity. In addition, we prove the polynomial growth harmonic function theorem analogous to the case of Riemannian manifolds.

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